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AN INTERESTING ANT FROM MUSKOKA

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In the year 1905 Dr. W. M. Wheeler published a revision of the North American species of ants of the genus *Dolichoderus*, in the Bulletin of the American Museum of Natural History; Vol. XXI.

Among the ants treated in this revision is one which he describes under the name of *Dolichoderus taschenbergi*, var. *gagates*. The varietal name, "*gagates*," he later changed to *aterrimus*, finding the former preoccupied.

Dr. Wheeler found this ant, and *D. mariae* common on the pine barrens of New Jersey where he studied them, and in his revision he gives an interesting account of their habits and of the character of their nests.

His studies show that the North American Dolichoderi represent at least three distinct species: *D. mariae* Forel, *D. plagiatus* Mayr, and *D. taschenbergi* Mayr, and that they are terrestrial in their nesting habits and monodomous—each colony occupying but one nest. They frequently climb bushes and trees in search of plant lice, the honey-dew of which forms a large portion of their food.

The nests on the pine barrens were excavated in pure sand and usually about the roots of brown beard-grass (*Andropogon scoparius*) or of turkey beard (*Xerophyllum setifolium*), the ants digging a pot-shaped cavity 12 to 18 inches deep and 3 to 5 inches in diameter, and the brood was stored in the spaces between the root fibres. Vegetable debris such as bits of dead leaves and pine needles were heaped over the nest entrance, sometimes forming a low mound, but quite as often the surface soil and debris over the nest would settle and become concave owing to the excavation of that beneath by the ants.

I was fortunate enough to have the opportunity to observe and collect this ant and examine its nest while camping in the Muskoka district during the summer of 1919, about a mile and a half down stream from Mary Lake, beside the Muskoka River. One bright, sunny morning, on the 30th of June, while wandering through some light, second growth woods in a dry, elevated region, my attention was arrested by a crowd of shining black ants crawling over a decayed log. They had a long trail established leading from the log along a dead branch, then over the ground to a young balsam tree; and the ants were climbing in large numbers up the stem of this tree. On climbing the tree and following their trail to the top I discovered some very large black aphids with reddish legs (*Lachnus curvipes* Patch), and the ants were attending these aphids. On returning to the log where I first saw the ants, I noticed another trail leading off in a different direction, and followed it in hopes of finding the nest, but on tracing it out, found it led to a white pine tree which the ants were climbing in a continuous file. As before, I climbed the tree and followed the trail to its

ending among the high branches, where I found some more aphids of a smaller species (*Lachnus* sp.) with ants in attendance on them. Both this trail and the one leading to the balsam tree started from the same point on the log. This point, where the trails met, seemed to be a kind of rendezvous and the ants had apparently tunnelled a little into the rotten wood and were making use of the shelter of natural crevices, where they would congregate in considerable numbers.

On their way up the pine tree the ants would stop and rest in little groups in some of the main forks where the large branches left the trunk, although no aphids were present in those places to attract them. It was by following still a third trail leading to and from the little rendezvous in the log that I eventually discovered the nest. It was located at the base of a small maple shrub about 8 or 9 feet from the log. The entrance was marked by a dome-shaped structure built of pine and balsam needles. This dome was about 14 inches in diameter at the base, and perhaps 7 or 8 inches high. The workers were crawling over it in swarms and a few of the winged, sexual forms were also out taking an airing. These latter were very shy, and quickly retreated into the nest on the least disturbance.

On opening the dome, I found in the centre a space of two inches or more in diameter and extending down at least to the base; I did not determine how much deeper. In this space the sexual pupae were stored and large numbers of workers were gathered in thick clusters.

On tearing open the walls of the dome and searching among the debris, I found some lepidopterous larvae living. These caterpillars were of a brownish colour with dark brown heads, and their bodies were sparsely covered with short, stiff bristles. They were not Lycaenid larvae, which one might expect to find in such a location, but were the larvae of a moth. I later sent these caterpillars to Dr. J. McDunnough for examination, and he reported on them as noctuid larvae and probably belonging to the subfamily Hypeninae. The ants were evidently used to the caterpillars because, when I dropped one into the mass of ants in the middle of the nest, it was not hurt nor interfered with, but a fly dropped into the same place was attacked and killed at once; and when the mass of ants were touched with the point of the forceps they clung to it in numbers and bit at it viciously.

They resented bitterly my intrusions and the atmosphere above the nest was pungent with the fumes of their poison glands, which in this case closely resembled formaldehyde in its burning, penetrating odour.

In the vicinity of the nest the ants were very pugnacious and when attending the aphids on the trees they were somewhat so, but while resting in the little rendezvous in the log and when en route on the trails they were very docile and would crouch down or run away sooner than fight.

On the following day at Port Sydney, at Mary Lake, I found another nest of this same species of ant. They had a long, winding trail established leading to a small tree about seventy feet distant by their meandering route, where they were attending aphids. They had also a short trail leading in the opposite direction to some blueberry bushes. Here again aphids were the attraction.

In the case of this nest also, the entrance dome was built of pine and balsam needles, and was sheltered by some small shrubs and brackens. The dome was not so large as that of the nest seen on the previous day, and I could not find any lepidopterous larvae in the walls. These ants had a fondness for travelling under cover as much as possible; wherever there was a dead branch or a piece of board, or any rubbish lying on the ground the trails would follow along beneath these, although in the absence of cover they would not hesitate to travel over the open ground, or even across bare rock.

The colonies of this species are decidedly large; the ants which I saw out on the trails at one time would number many hundreds, perhaps several thousand, and the number within the nest when opened was certainly immense. Here the workers hung together in large clusters. This second nest also contained many males and virgin queens more advanced in development than those seen in the nest found on June 30th, for they were crawling over the outside of the dome in large numbers, evidently getting ready for flight.

Speaking of the sexual phases, Dr. Wheeler records finding, on August 19 and 20, 1905, nests of *Dolichoderus mariae* containing the male and female pupae, mature males and callow females. Dealated and winged females were also running over the ground. On September 16 and 17 he again opened nests of this species, but only in one did he find sexual forms, which were mature and apparently belated females, and no sexual pupae were present. He also searched the nests of *D. aterrimus* on all these dates for sexual forms but did not find any, so he concludes that the nuptial flight must occur earlier in this species. The observations which I had the opportunity to make on this ant in Muskoka would point to the same conclusion, because the nest which I opened on June 30th contained many sexual pupae, besides a good number of winged females and males. And the one opened on July 1st in a more sunny location was apparently on the verge of swarming, as the mature sexual forms were abundant and very active. This species is evidently not abundant in Muskoka, at least not in the region where I was stationed, as I only came across it three times during a period of about ten weeks. The third time was late in August, when I found them attending aphids on some shrubs on the shore of a small lake, and this time I did not succeed in locating the nest. Specimens of the aphids found in company with the ants on the balsam and white pine trees on June 30th were later sent to Mr. W. A. Ross for determination, but owing to the fact that those taken on the white pine were all wingless, agamic females, specific identification in this case was impossible. Mr. Ross then forwarded the doubtful specimens to Dr. A. C. Baker, at Washington, for comparison with specimens in the United States National Collection, but he also found it impossible to run them down any closer than the genus.

The ants were identified by Dr. Wheeler, who, as already explained, was the first to recognize and describe the variety *aterrimus*.

OBSERVATIONS ON THE CHERMIDAE (HEMIPTERA; HOMOPTERA). PART I.

BY G. F. FERRIS,
Stanford University, California.

In the course of a rather careful examination of the North American literature dealing with the family of Homoptera that is usually known as the Psyllidae, I have been unable to find a single description of the immature stages of any species that would permit the positive identification of the species from these stages. In some cases a more or less definite determination may be arrived at by taking into consideration the circumstantial evidence of host and habit, but as far as the insects themselves are concerned, practically nothing can be done unless the adults as well are available. Nor in the course of a confessedly random, but nevertheless fair, sampling of the European literature have the results been any better.

That this experience is not peculiar to myself is indicated by the following statements of Crawford, who has monographed the New World species of the family. He says[1]: "Determination of the species when only the nymphal form is available is quite impossible at present. . . . the best that can be done is to determine, sometimes, the subfamily to which the nymphs belong."

The existence of this situation is probably due in part to the almost complete lack of interest in these immature stages and to that extent it is by no means peculiar to this particular family. But this is probably not all. It appears also to be due in some measure to the methods that have been used in their study. The manner of approach has not been that which would yield the most satisfactory results.

In this, as in all the groups of small insects, the method of study constitutes—in my estimation—about ninety per cent. of the equipment of the student. The first requisite is the possession of preparations that are adequate for the purposes of study. This is a fact that has finally been realized by most of the students of the Coccidae but which seems not yet to have penetrated into the consciousness of those in many other fields. There is still much to be done before the idea is finally hammered home that no amount of labor and no amount of care is wasted that will yield preparations in which it is possible to see clearly the structures that must be seen in order to establish our systematic work on a firm foundation.

As a basis for the studies which will follow, I am utilizing material that has been prepared in the manner now generally accepted in the study of the Coccidae. The specimens are cleared in caustic potash, the body contents removed and the derm stained with magenta. In the case of very heavily chitinized forms these preparations are supplemented by others that are left unstained. There is thus revealed a wealth of structural characters, many of which seem never to have been seen before. I may add that the study of the adults even is not complete without the utilization of such material in addition to the ordinary dry specimens.

In the course of these papers two objects will be kept constantly in view.

1. Crawford, J. C. A Monograph of the Jumping Plant-lice or Psyllidae of the New World. U. S. Nat. Mus. Bull. 85: 17. 1914.

One is so to describe and figure the immature stages as to permit the positive determination of the species concerned in the absence of material for comparison. The other is to arrive at an evaluation of the various characters in order to obtain a classification based upon the nymphs as a check upon that based upon the adults. This second object offers some interesting possibilities. The material already available indicates some agreement and some disagreement with the existing classification. Certain species that are now placed together on the characters of the adults have very little resemblance in their nymphal stages. To what extent the two are reconcilable remains to be seen.

In the preparation of the figures which are to accompany these papers I have adopted as my standard the ideal of showing every structure that can be seen on the body of the insect and that can conceivably be of aid in identifying it. I am convinced that eventually such a standard must be generally adopted if we are ever to arrive at anything approaching permanence in our systematic work. It does not accord with our modern conceptions of efficiency that the enormous volume of work involved in our systematic biology must be done over and over again as our standards change. I see no reason why it should not be possible to arrive once and for all at a standard that will endure. It is perfectly possible for a worker of the present day to see everything that is to be seen upon the body of an insect and I cannot conceive of any mysterious way in which the workers of periods to come can do anything more.

It must, of course, be recognized that even the most conscientious worker is fallible. Furthermore, the overlooking of the obvious is a trait so common that it is hardly to be hoped that anyone—little less the present writer—will be able to attain positively to such an ideal. This, however, need deter no one from the adoption of such a standard.

In cases where it appears that something of value may be added to the existing descriptions of the adults I shall present notes and figures dealing with these also. References will in general not be given and the student is referred for these to the monograph of Crawford mentioned above.

Psyllopsis fraxinicola (Foerster)

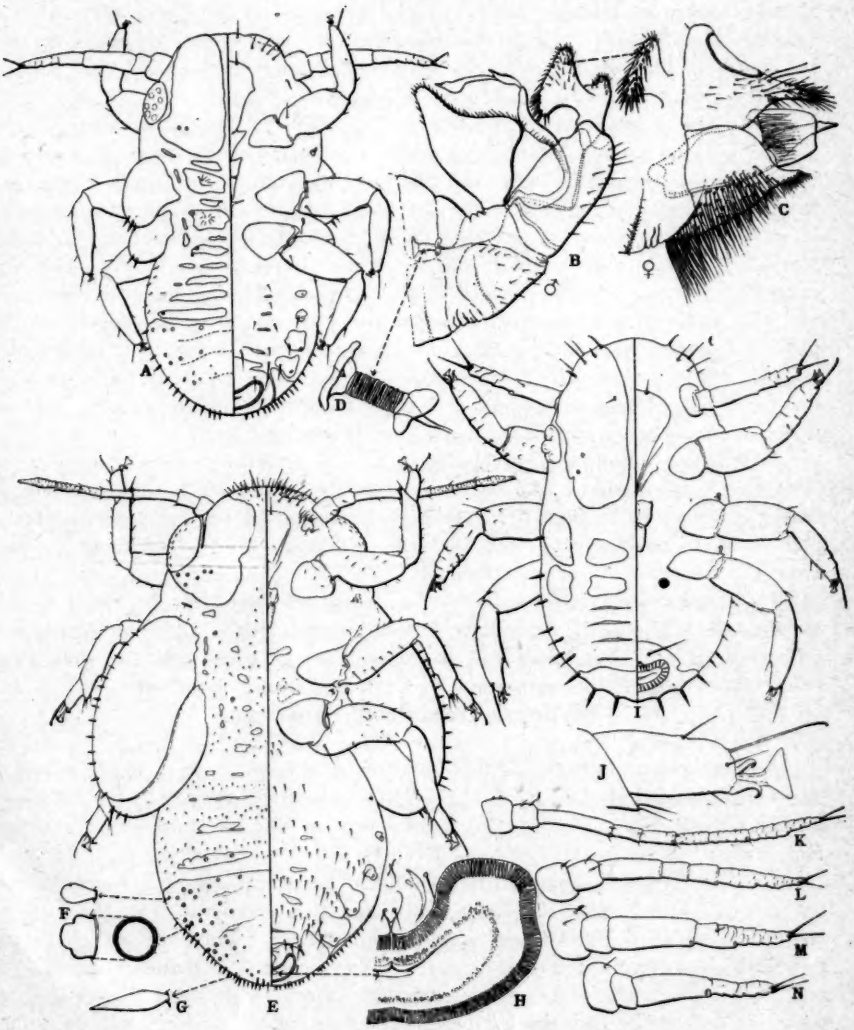
Plate XII.

MATERIAL EXAMINED. Adults and nymphs from "eastern black walnut," Stanford University, Calif., Oct. 13 (C. D. Duncan); nymphs from *Fraxinus dipetala*, North Fork, Madero Co., Calif., May 15 (R. H. Hartman) and from *Fraxinus* sp., Idaho, June 13 (J. C. Evenden).

HABIT. The specimens from walnut at Stanford University occurred on the under side of the leaves. The nymphs were pale green and from the dorsum rose numerous curling threads of wax, these doubtless originating from the large pores which are a characteristic feature of the species. Individuals which had remained in one place for some time were entirely covered by these threads. The posterior end of the body bore a projecting, flattened cylindrical lump of white wax which was readily detachable. This evidently rose from the pore ring surrounding the anus.

ADULT. The description and figures given by Crawford omit certain details of value. In the female the ventral valve of the ovipositor (Plate XII, fig. *C*) bears an area of light colored setae which is very conspicuous, but which is not referred to in the description. I have seen nothing similar to this in any other

CAN. ENT. PLATE 12.



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species yet examined.

The genitalia of the male are rather inadequately figured by Crawford. The forceps (Pl. XII, fig. *B*) are beset on their outer face merely by fine setae, but on the inner face there are numerous stout setae. The anal valve likewise bears on its inner face at the posterior apex numerous small, cephalically pointing setae.

I wish here to call attention to a structure that is not referred to in any of the descriptions that I have seen, but which appears to have some systematic value. This is an expansion of the anterior extremity of the spermatic duct (Pl. XII, fig. *D*) in the male. In this species it is short and spool-shaped, the ends with a heavily chitinized flange, the median portion transversely striate.

NYMPHAL STAGES. In the material available there are very evidently five nymphal stages. As this agrees with the number found in *Euphyllura arbuti*[2] I have no doubt that this is all there are.

Fifth stage (Pl. XII, fig. *E*). Length 2 mm. Elongate; the wing pads large and projecting well beyond the contour of the body, not produced anteriorly. Derm membranous over the greater part of the body.

Antennae (Pl. XII, fig. *K*) slender, slightly less than half as long as the body, eight-segmented, the last three segments slightly imbricate. Legs without trochanter; with the joint between tibia and tarsus well defined, the tarsus about a third as long as the tibia and bearing a large pulvillus (Pl. XII, fig. *J*) which consists of a slender stalk with a fish-tail shaped expansion distally.

Dorsum with a pair of large, chitinized areas between the eyes; with several very small plates on the thorax which are arranged as indicated; with four very small plates on each of the first two abdominal segments and two larger plates on the next two; with the apical third, including apparently the last three segments, consisting of a single heavily chitinized plate. This plate bears a number of conspicuous pores or pore prominences of the type indicated in Pl. XII, fig. *F* and a few smaller structures having the appearance of short, clavate setae, shown in the same figure. The large cephalic plates each bear five or six of these large pores and there are two or three of them on the thorax and two on each plate of the fourth abdominal segment. The margin of the apical plate and of the wing pads likewise is beset with short, lanceolate setae (Pl. XII, fig. *G*) in an irregular single row and the dorsum bears numerous very minute setae of the same type.

Ventral side with a cluster of slender setae between the bases of the antennae and with a small plate near the base of each antenna. Abdomen with a plate surrounding the anus; with a small plate around each of the last four spiracles; with three pairs of small submedian plates. Each segment with a transverse series of small, slender setae. Anal opening enclosed within a pore ring (Pl. XII, fig. *H*) composed of a single row of slit-like pores. Within this ring there is also another ring of small circular or irregular pores.

Fourth stage. In general character very similar to the fifth but with the dorsal plates of the thorax and the first four abdominal segments larger; with no division between the tibia and tarsus; with the antennae (Pl. XII, fig. *L*) six-segmented and relatively stouter.

2—Ferris, G. F. and Hyatt, Persis. The Life History of Euphyllura arbuti Schwarz. Can. Ent. 55: 88-92. 1923.

Third stage (Pl. XII, fig. *A*). With the general characters of the fourth stage, but with the eyes few-facetted; with the antennae (Pl. XII, fig. *M*) four segmented and relatively stout. Wing pads small, but distinct and free at the tips, the tips bearing merely two or three lanceolate setae.

Second stage. Very similar to the third but with the antennae three-segmented (Pl. XII, fig. *N*). Wing pads smaller and bearing but a single seta at the apex. Apical plate of the dorsum with but four lanceolate setae on each side and with but three pores.

First stage (Pl. XII, fig. *I*). Antennae as in the second stage. Dorsal plates as indicated in the figure, there being but two large thoracic plates in addition to the rudiments of the wing pads. Margin of the apical plate with but three lanceolate setae, this plate occupying but the extreme apex. Margin of the abdomen cephalad of the apical plate with five or six lanceolate setae. Pores entirely lacking. Ventral side with but the terminal plate surrounding the anus, this bearing the pore ring as in the other stages, but with the pores few.

Note: This species is the type of the genus.

Ceropsylla sideroxyli Riley.

MATERIAL EXAMINED. A single adult male and nymphs from *Sideroxylon masticodendron*, Arch Creek, Florida, Mar. 16, 1923. These specimens were received through the kindness of Mr. G. B. Merrill.

HABIT. Occurring in pit galls on the under side of the leaf, these galls showing as roughened elevations on the upper side. The insects are covered with a copious secretion of white wax, which makes them very conspicuous.

ADULT. There are certain discrepancies between the descriptions given by Crawford and my specimen, but in the absence of the female I leave any notes on the adults until both sexes are available.

NYMPHAL STAGES. My material contains specimens of but three stages, the last, next to the last and the first. Assuming that the same number of stages are found in this as in other species these will be the fifth, fourth and first.

Fifth stage (Fig. 1 *A*). Length 2.5 mm. Form very broadly oval, almost circular. Dorsum heavily chitinized except for the joint between thorax and abdomen. Wing pads not projecting beyond the contour of the body, produced cephalad beyond the eyes. Entire margin of the body beset with a continuous fringe of structures for which no other term than setae seems to be available, these broad and flattened and borne on low prominences (Fig. 1 *D*). The dorsum for a short distance back from the margin is thickly beset with small, clavate setae, these giving way to minutes pores which are distributed over the entire dorsum.

Ventral side apparently membranous throughout. Antennae (Fig. 1 *B*) very short, the segmentation obscure; apparently there are seven segments. Legs scarcely reaching to the margin of the body; with the femora attached to the coxae in a peculiar maner which I have not been able entirely to decipher from my specimens; without trochanter; with the division between tibia and tarsus very obscure or even lacking. Tarsi without claws, the pulvillus of a very peculiar shape, being in the form of a circular pad (Fig. 1 *C*). Anal opening set well away from the apex of the abdomen, surrounded by a pore ring consisting of a single row of slit-like pores (Fig. 1 *E*), this ring interrupted medially

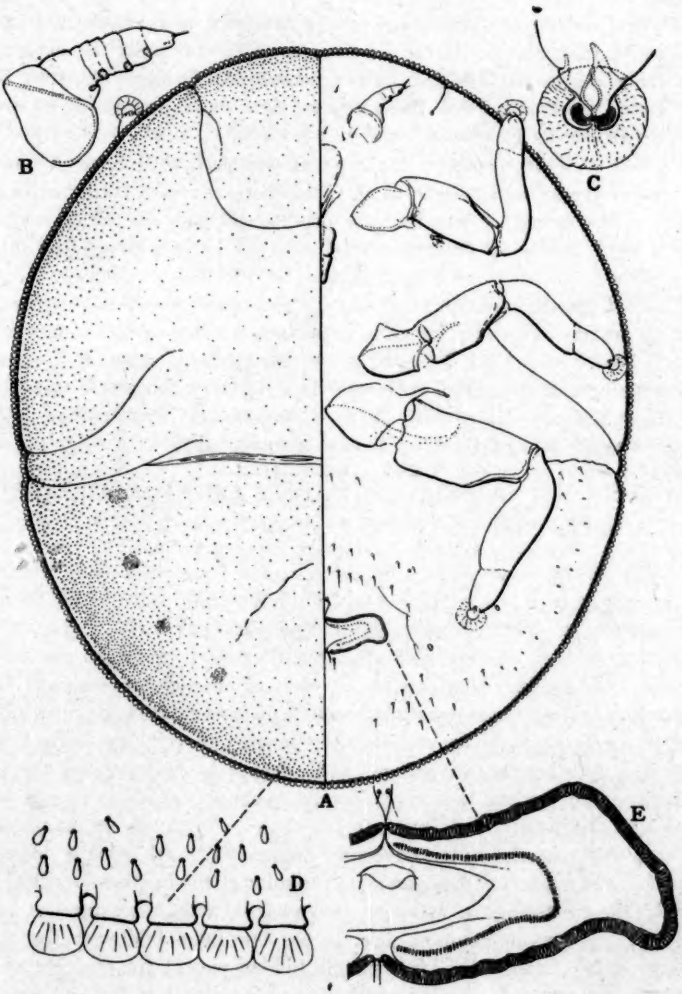

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Fig. 1. Ceropsylla sideroxyli Riley. A.- nymph of last stage; B.-antenna; C.- pulvillus; D.- marginal fringe and modified setae of dorsum; E.- pore rings and structures about the anus.

both anteriorly and posteriorly. Within this ring is another of similar character but with the pores small and somewhat indistinct.

Fourth stage. In general identical with the fifth except for smaller size and relatively larger and fewer marginal setae and fewer clavate setae on the dorsum.

First Stage. Of this but a single specimen is available and this is badly attacked by fungus. As far as may be determined it possesses a complete marginal fringe as in the adult, is heavily chitinized throughout, lacks the clavate setae of the dorsum and has the antennae very short, apparently two-segmented. The pulvilli are as in the fifth stage.

Note: This species is the type of the genus. I have at hand nymphs of a species from *Ficus palmeri* at El Triunfo, Lower California, which probably belongs to this genus. They likewise produce pit galls on the leaves but are not covered with wax. In the absence of adults I am not describing this.

EXPLANATION OF PLATE.

Psyllopsis fraxinicola (Foerster). A.—third stage; B.—genitalia of adult male; C.—ovipositor of female; D.—expansion of the spermatic duct of the adult male; E.—fifth stage; F.—types of pores and modified setae; G.—marginal seta; H.—pore ring and structures about the anus; I.—first stage; J.—tarsus of nymph, fifth stage; K.—antenna of fifth stage; L.—antenna of fourth stage; M.—antenna of third stage; N.—antenna of second or first stage.

NOTES ON THE FEEDING HABITS OF AN ADULT SAWFLY

BY W. G. GARLICK,
University of Kansas, Lawrence, Kans.

The adults of an elm sawfly, *Macroxyela ferruginea* (Say), were particularly abundant in this locality for about three weeks during the present spring and especially so during the week of April 10th to 17th. They were found feeding on the buds of American elm and to a lesser extent on the buds of pear and plum. It is likely that this list of buds eaten could be extended by further observation, though in the examples cited there was a marked preference for elm, which is the food of the larvae. In the case of the elm the buds attacked had grown in length but the leaves had hardly begun to show beyond the tips of the bud scales. In feeding the insect usually began by gnawing a hole in the side of the bud about two-thirds up from the base. With the serrated mandibles a hole was made in the outer covering, frequently much of the material being dropped in the process. As soon as the middle of the bud was reached the insect ate only the central part, working downwards and enlarging the opening as necessary. It was a common sight to see one on a bud with the thorax and abdomen visible but the head completely hidden except for the tips of the backward-bent antennae. If undisturbed the insect often left the bud a mere empty shell, or so badly injured that no further growth took place. Quite frequently there would be sharp encounters for the possession of a bud, the new arrival usually succeeding in ousting out the original possessor—the one that had taken the trouble to pierce the bud. The insects seemed to be ravenously hungry and continued their feeding after the methodical manner of leaf-feeding larvae. With plum and pear the blossom buds were preferred to the leaf buds and some trees suffered somewhat from this injury, though the total damage done was not great.

Both sexes probably feed, though only one male was actually observed feeding. From over two hundred netted specimens the sex ratio ran about five females to one male. Adults were seen feeding throughout the period in which they were at all numerous. The first adult was taken on March 30th and the last on April 24th.

The determination of this sawfly was verified for the writer through the kindness of Mr. Rohwer.

The writer knows of no record of adult sawflies feeding in a wholesale way as described above. Rohwer[1] has recorded a individual of *Tenthredella lineata* (Prov.) devouring an adult Perlid and in the same article notes *Tenthredo arcuatus* (Foerster) eating four stamens of Umbellifer. He also refers to the fact that Morley[2] mentions a female of the latter species as having been seen masticating a female of *Empria pennipes*, so that this sawfly seems to be both carnivorous and herbivorous. Miss Chawner[3] in a note on the feeding habits of sawflies speaks of *Allantus arcuatus* killing and eating small insects. This is probably the species mentioned by Rohwer above. The other diets named by Miss Chawner are pollen of various flowers and the leaves of ash, the latter in the case of *Macrophya punctum-album* only. Venables[4] reports an adult eating Diptera. Peacock[5] states that certain species in his breeding experiments would not oviposit unless supplied with sugar syrup.

Further observations on the life history of *Macroxyela ferruginea* (Say) will be given later.

NEW SPECIES OF NORTH AMERICAN PLECOPTERA

BY P. W. CLAASSEN,
Cornell University, Ithaca, N. Y.

Leuctra bradleyi sp. nov.

Plate XIII, Fig. 1.

Length to tip of wings, male, 6 mm.; expanse 10.5 mm.

General color brown. Head brown, wider than prothorax, feebly pilose; hind ocelli about two diameters distant from eyes. Prothorax hardly wider than long, brown; front angles quite broadly rounded, hind angles sharp; slightly narrowed behind; median longitudinal prothoracic field one-fourth the width of pronotum; discs somewhat rugose. Legs brown. Wings reddish fumose; two cubital crossveins beyond m-cu crossveins.

Genitalia. Male. Abdominal tergites unmodified except ten, which is partly cleft, each side being triangularly produced posteriorly; supraanal lobe triangular, bearing at the tip a slender, re-curved, whip-like process; cerci modified into chitinous armed processes, bulbous at the base and bearing at the tip, as well as below, a sharp tooth; subanal lobes greatly modified into a probe, each lobe receding into segment nine, where the two lobes unite into a long, slender, posteriorly produced, up-curved probe bearing at the tip a bulbous membranous enlargement; titillators absent; ninth sternite produced into a subgenital

1—Proc. Ent. Soc. Wash. XV, pp. 148-149. 1913.
2—Entomologist, London, XLVI, p. 48, Feb. 1913.
3—Ent. Month. Mag. London, p. 19. 1921.
4—Can. Ent. XLVI, p. 121. 1914.
5—Entomologist, London, pp. 227-231. 1922.

plate which is medially deeply and broadly notched; ventral lobe large, hairy, and half again as long as wide.

Female. Unknown.

Holotype: male, July 4, 1908, Emerald Lake, Canadian Rockies, J. C. Bradley, Cornell University Collection.

Leuctra biloba sp. nov.

Plate XIII, figs. 2 and 3.

Length to tip of wings: male, 7 mm; female, 8.5 mm.; expanse: male, 12 mm.; female, 14.5 mm.

General color blackish brown. Head wider than prothorax, blackish, closely covered with fine pile; hind ocelli between two and three diameters distant from eyes. Prothorax dark brown, a little narrowed behind (male); wider than long; front angles broadly rounded, hind angles rather sharp; median longitudinal prothoracic field at least one fifth the width of pronotum; discs only slightly rugose. Legs brown. Wings dusky fumose; 2-4 cubital crossveins beyond m-cu crossveins.

Genitalia: *Male.* From the anterior margin of the eighth tergite there projects backward a raised bilobed chitinous process, the lobes of which are truncate; from the tenth tergite projecting forward a bilobed chitinous process whose lobes are evenly rounded; supraanal lobe broadly rounded; cerci unmodified; subanal lobes broadly elongate; titillators slender, a little shorter than subanal lobes; ninth sternite somewhat produced, not heavily chitinized; ventral lobe half again as long as wide, bearing long hairs.

Female. Eighth abdominal sternite produced into a bilobed subgenital plate with a shallow, triangular median notch.

Holotype, male; *allotype,* female; May 20-25, '11, Black Rock Mt., Rabun Co., Ga., Cornell University Collection.

Paratype: 1 male, same locality.

Leuctra carolinensis sp. nov.

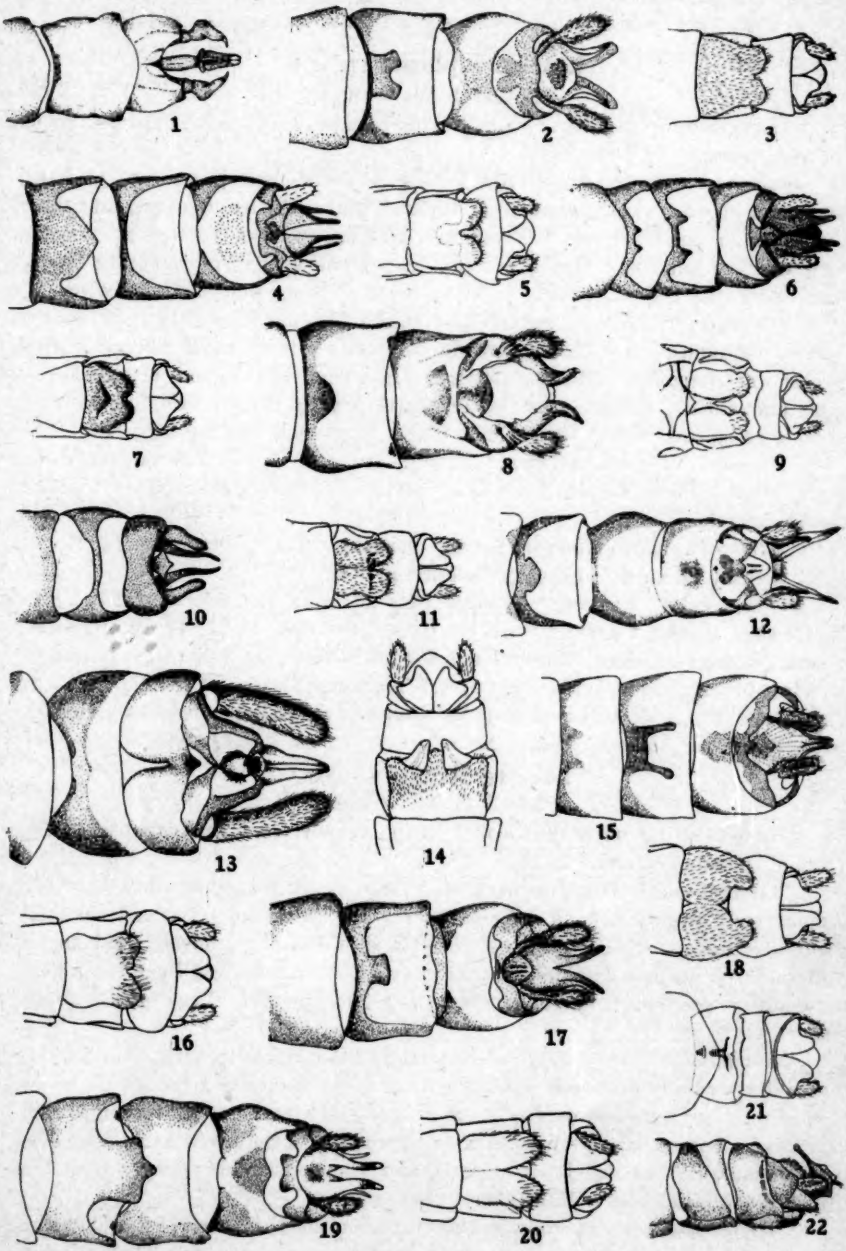
Plate XIII, figs. 4 and 5.

Length to tip of wing: male, 8.5 mm., female, 9 mm.; expanse: male, 15 mm., female, 15.5 mm.

General color dark brown or blackish. Head blackish brown, wider than prothorax; hind ocelli about two diameters distant from eyes. Prothorax dark brown, the rugosities blackish; wider than long, not narrowed behind; front angles rounded, hind angles sharp; median longitudinal prothoracic field between one-quarter and one-fifth the width of the pronotum; discs quite rugose. Legs brown. Wings dark fumose.

Genitalia: *Male.* Seventh abdominal tergite bearing a broad, triangular, spatulate, raised, chitinous process reaching entirely across the seventh tergite; supraanal lobe triangular, short, hairy; cerci unmodified; subanal lobes quite broad; titillators about as long as subanal lobes, broad at base but beyond very slender and curved; ninth sternite slightly produced backward; ventral lobe small, wider than long, hairy.

Female. Eighth abdominal sternite produced into a bilobed, widely emarginate subgenital plate, reaching at least half way across the ninth sternite; the lobes of the plate bear long hairs.



NEW NORTH AMERICAN PLECOPTERA

Holotype, male; *allotype,* female; June, 1912, Black Mts., N. C., Beutenmuller, Cornell University Collection.

Paratypes: Males and females from same locality as the type.

Leuctra duplicata sp. nov.

Plate XIII, figs. 6 and 7.

Length to tip of wings: male, 7 mm., female, 8—8.5 mm.; expanse: male, 12 mm., female, 14.5 mm.

General color blackish brown. Head wider than prothorax, blackish, covered with pile; occiput somewhat rugose; hind ocelli between two and three diameters distant from eyes. Prothorax dark brown, wider than long; median longitudinal prothoracic field about one-quarter the width of pronotum; lateral discs somewhat rugose. Legs blackish brown. Wings blackish infuscated.

Genitalia: *Male.* Seventh and eighth abdominal tergites each with a narrow chitinous collar on the anterior margin, each of these collars bearing two short, triangular, chitinous processes; supraanal lobe somewhat triangular; cerci unmodified; subanal lobes broad, angulately upcurved; titillators slender, as long as subanal lobes; ventral lobe longer than wide, bearing long hair.

Female. Eighth abdominal sternite produced into a bilobed subgenital plate, notched in the middle, the lobes rounded, and before the notch a rounded raised tubercle.

Holotype, male; *allotype,* female; June 25, 1922, Labrador Lake, N. Y., C. R. Crosby, Cornell University Collection.

Paratypes: 2 males, 5 females, June 25, 1922, Labrador Lake, N.Y., C. R. Crosby; 1 male, 1 female, July 11, 1905, Brookline, Mass., C. W. Johnson; 1 male, June 12-22, 1901, Adron Mts., Axton, N.Y., A. D. MacGillivray and C. O. Houghton, 1 male, June 8-10, 1915, Chipmunk Swamp, Vandalia, N.Y.; 1 male, June 11, 1909, Woolworth Lake, Fulton Co., N.Y.; 2 females, May 27, 1919, Ringwood Hollow, Ithaca, N. Y.

Leuctra decepta sp nov.

Plate XIII, figs. 8 and 9.

Length to tip of wings: male, 7 mm., female, 8.5 mm.; expanse: male, 11 mm., female, 14 mm.

General color brown to blackish. Head wider than prothorax, blackish, occiput finely granulate; hind ocelli between 3 and 4 diameters distant from eyes. Prothorax brown, wider than long; front angles broadly rounded, hind angles rather sharp; median longitudinal prothoracic field a little less than one-fourth the width of pronotum; lateral pronotal discs quite rugose. Legs brown, wings dusky.

Genitalia: *Male.* Eighth abdominal tergite with a narrow anterior chitinized collar medially produced into a short, rounded knob which is not raised or very slightly so; anterior margin of seventh tergite sometimes with a suggestion of a smaller but similar chitinized area as eighth; supraanal lobe broadly rounded; cerci unmodified; subanal lobes quite slender and considerably longer than the titillators; ventral lobe a little longer than wide.

There seems to be considerable variation in the extent to which the chitinizations on the abdominal tergites of the males have developed in this species.

Female. Eighth abdominal sternite produced into a broadly and deeply notched, bilobed subgenital plate, bearing long hairs and reaching nearly half way across the ninth sternite.

Holotype, male; *allotype*, female; June 29, 1922, Ringwood Hollow, Ithaca, N. Y., Cornell University Collection.

Paratypes: 2 males, 5 females, same locality as types; 1 male, June 7, 1905, Old Forge, N. Y.

Leuctra glabra sp. nov.

Plate XIII, fig. 10.

Length to tip of wings: male, 6 mm. Expanse: male, 10.5 mm.

General color reddish brown. Head brown, wider than prothorax, covered with rather long pile; hind ocelli at least twice as close to eyes as to each other. Prothorax not narrowed behind, wider than long; front angles very broadly rounded; hind angles sharp; median longitudinal prothoracic field about one-quarter the width of pronotum; discs of pronotum slightly rugose. Legs brown. Wings rusty fumose; two to three cubital crossveins beyond m-cu crossveins.

Genitalia: *Male.* Tergites of abdomen unmodified except nine in which the chitinized portion is reduced to a narrow, transverse band; supraanal lobe triangular; cerci unmodified; subanal lobes modified into long, slender upcurved processes; titillators absent; ninth sternite not much produced posteriorly; ventral lobe absent.

Female: unknown.

Holotype: male, Nov. 15, 1899, Jannalpais, Calif., L. O. Howard. In the National Museum, Washington, D. C.

Leuctra hamula sp. nov.

Plate XIII, figs. 11 and 12.

Length to tip of wings: male, 7.5 mm., female, 9 mm. Expanse: male, 14 mm.; female, 15 mm.

General color brown to dark brown. Head wider than prothorax, dark brown or blackish; hind ocelli about two diameters distant from the eyes. Prothorax dark brown, wider than long, narrowed behind; front angles rounded, hind angles sharp; median longitudinal prothoracic field about one-fourth the width of pronotum; discs of pronotum quite rugose. Legs dark brown, wings lightly fumose.

Genitalia: *Male.* Seventh abdominal tergite bearing a medium sized, short, raised, spatulate process which does not extend to the middle of the seventh tergite; supraanal lobe rounded behind; cerci unmodified; subanal lobes quite broad; titillators about as long as subanal lobes, at the tip sharply recurved; ventral lobe about as wide as long.

Female. Eighth abdominal sternite produced into a bilobed, widely notched, subgenital plate which reaches half across the ninth sternite; the lobes are truncate and bear long hairs; median field of seventh and eighth sternite blackish.

Holotype, male; *allotype*, female; July, 1905, Old Forge, N. Y., Cornell University Collection.

Paratypes: 5 males, 2 females, June 24, 1905, Old Forge, N. Y.; 1 male, 1 female, 6-23-10, Woolworth Lake, Fulton Co., N. Y.; 1 male, Sacandaga Park, N. Y., E. P. Felt; 1 male, 1 female, Aug. 16, Mt. Marcy, Keene Valley, N. Y.; 1 male, 6 females, Aug., 1912, Mt. Kathadin, Me.

Leuctra infuscata sp. nov.

Plate XIII, figs. 13 and 14.

Length to tip of wings: male, 7 mm., female, 9 mm.; expanse: male, 11 mm., female, 15 mm.

General color dark brown. Head wider than prothorax, nearly smooth; hind ocelli about twice as close to eyes as to each other. Prothorax dark brown, narrowed behind, wider than long, median longitudinal prothoracic field between one-third and one-quarter as wide as pronotum; discs of pronotum somewhat rugose, the rugosities blackish. Legs dark brown. Wings infuscated; Sc_2 bends down to R, not at a sharp angle, but more or less with a gradual curve; 2-3 cubital crossveins beyond m-cu crossveins.

Genitalia. *Male*. Tergites of abdominal segments unmodified; supraanal lobe produced into a short, bulbous process which is excavated above and on the lateral upper margins with a narrow, chitinous band closely beset with long hairs, cerci membranous, very large, about four times as long as wide; subanal lobes produced into long sword-like processes, abruptly drawn to a slender rod before the tip and near the tip bearing below a recurved spine; titillators curved down and then up again, slender, heavily chitinized; ventral lobe very short, hairy, much wider than long.

Female. Eighth abdominal sternite produced into a subgenital plate, which is medially somewhat raised into a hairy ridge, notched in middle, the notch produced by the projection of a triangular, heavily chitinized plate on each side.

Holotype: male, 3-15-98, Seattle, Washington, Cornell University Collection.

Allotype: female, 4-28-98, Seattle, Washington.

Paratypes: 1 female, 4-14-99, Seattle, Washington; 3 females, June 6, 1920, Shasta Springs, Calif., C. L. Fox; 1 female, 6-10-21, Yosemite Valley, Calif., E. C. Van Dyke.

Leuctra sibleyi sp. nov.

Plate XIII, figs. 15 and 16.

Length to tip of wings: male, 8.5-9.5 mm., female, 9.5-11 mm. Expanse: male, 14.5-15.5 mm., female, 16-20 mm.

General color brown. Head wider than prothorax; occiput somewhat rugose and mottled with darker brown; hind ocelli between two and three diameters distant from eyes. Prothorax wider than long, brown; angles broadly rounded; median longitudinal prothoracic field at least one-fifth the width of pronotum; discs of pronotum quite rugose, the rugosities darker. Legs brown. Wings subhyaline to brownish infuscated.

Genitalia: *Male*. Anterior margin of eighth tergite heavily chitinized and bearing two long, slender, widely separated, raised chitinous processes which reach over the entire eighth tergite; supraanal lobe rounded behind; cerci unmodi-

fied; subanal lobes quite long and slender; titillators slender, nearly straight, shorter than subanal lobes; ventral lobe at least twice as long as wide.

Female. Eighth abdominal sternite somewhat produced into a bilobed hairy subgenital plate with a small median notch.

Holotype, male; *allotype*, female; May 16, 1922, Moore's Brook, Ithaca, N. Y., C. K. Sibley, Cornell University Collection.

Paratypes: 5 males, 10 females, May 16, 1922, Moore's Brook, Ithaca, N. Y.; 3 males, 1 female, May 15, 1915, Taughanic, Ithaca, N. Y.

Leuctra triloba sp. nov.

Plate XIII, figs. 19 and 20.

Length to tip of wings: male, 6.5 mm., female, 8 mm. Expanse: male, 11 mm., female, 14 mm.

General color dark brown. Head wider than prothorax, brown; hind ocelli between two and three diameters distant from eyes. Prothorax brown, considerably wider than long; front angles somewhat rounded, hind angles sharp; median longitudinal prothoracic field at least one-quarter the width of pronotum; lateral discs somewhat rugose. Legs brown. Wings uniformly reddish fumose.

Genitalia: *Male.* Seventh abdominal tergite with a large, raised, more or less trilobed, chitinous process which reaches well unto the eighth unarmed tergite; supraanal lobe short, rounded; cerci small, unmodified; subanal lobes quite broad and apically very finely spinulate; titillators slender and shorter than subanal lobes; ventral lobe about as broad as long.

Female. Eighth abdominal sternite produced into a bilobed, hairy, subgenital plate which is rather narrowly notched in the middle.

Holotype, male; *allotype*, female; Sept. 14, 1899, McLean, N. Y., Jensen, Cornell University Collection.

Paratypes: A number of males and females from the same locality.

Leuctra truncata sp. nov.

Plate XIII, figs. 17 and 18.

Length to tip of wings: male, 7 mm., female, 8-9 mm. Expanse: male, 12.5 mm., female, 15-17 mm.

General color brown. Head wider than prothorax, uniformly brown, occiput slightly rugose; hind ocelli between two and three diameters distant from eyes. Prothorax brown, a little wider than long., slightly narrowed behind; median longitudinal prothoracic field about one-quarter the width of pronotum; lateral discs moderately rugose. Legs brown, wings subhyaline.

Genitalia: *Male.* Seventh abdominal tergite smooth; eighth tergite bearing, near the anterior margin, a short, median, raised, truncate, chitinous projection, about as wide as long; supraanal lobe short, triangular; cerci unmodified; subanal lobes quite slender; titillators considerably shorter than subanal lobes; ventral lobe very little longer than wide.

Female. Eighth abdominal sternite slightly produced into a broadly notched bilobed subgenital plate, the lobes rounded and bearing long hairs.

Holotype, male; *allotype*, female; Aug. 9, 1905, Old Forge, N. Y., Cornell University Collection.

Paratypes: Many males and females from same locality.

(To be continued)

NOTES ON THE EGANS GROUP OF OLIGIA (PHALÆNIDÆ, LEPID.)

BY WM. BARNES AND F. H. BENJAMIN,

Decatur, Ill.

Oligia violacea Grote

1881. Grote, Bull. Geol Surv. Terr., VI, 261, *Hadena.*
1893. Smith, Bull. U. S. N. M., XLIV, 141, *Hadena.*
1903. Holland, Moth Book, p. 167, pl. XX, f, 12, *Hadena.*
1908. Hampson, Cat. Lep. Phal. B. M., VII, 375, pl. CXVII, f, 22, *Oligia.*

A somewhat variable species in color and brightness of pattern, the secondaries sometimes slightly tinged with fuscous but presenting a decidedly white ground color. The figures listed above will serve to identify the species, which is represented in the Barnes collection by specimens from Truckee, Mission San Jose, Nellie, and Plumas Co., Calif.; Pullman, Wash., Glenwood Springs, Silverton, and "Oak Creek Canyon," Colo.; Yellowstone National Park; and Eureka, Utah.

Oligia violacea race **rampartensis** nov. var.

Similar to *violacea* in size and markings, but so much darker in color that it was confused with *ferrealis* in the Barnes collection, the violaceous tints almost obscured. Orbicular and reniform somewhat smaller than normal for *violacea,* thus approaching *bridghamii.* Secondaries strongly tinged with fuscous.

The present subspecies may possibly be entitled to specific rank as there are several minor genitalic differences between it and *violacea.* Both agree, however, in possessing in the ædœagus, besides other armature, a strongly chitinized plate bearing only four teeth.

Type locality: Ramparts, Alaska.

Number and sexes of types: Holotype ♂, Aug. 1-7.

Oligia egens Walker

1856. Walker, Cat. Lep. Het. B. M., X 263, *Celaena.*
1882. Grote, Ill. Essay, p. 45, (on type), *Celaena.*
1889. Butler, Trans. Ent. Soc. Lond., p. 386 (*ferrea,*) *Mamestra.*
1891. Smith, Proc. U S. N. M. XIV. 251, *Mamestra.*
1893. Smith, Bull. U S. N M., XLIV. 144, (on type), *Hadena.*
1908. Hampson, Cat. Lep. Phal. B. M., VII, 377, pl. CXVII, f. 24, *Oligia.*

race *ferrealis* Grote

1883. Grote, Can. Ent., XV, 29, *Mamestra.*
1891. Smith, Proc. U. S. N. M., XIV, 269 ignot., *Mamestra.*
1893. Smith, Bull, U. S. N M., XLIV, 128, ignot., *Mamestra,*
1905. Hampson Cat Lep. Phal. B. M., V, 177, ignot., *Polia.*

syn. *transfrons* Neumoegen

1883. Neumoegen, Papilio, III, 139, *Hadena.*
1893. Smith, Bull. U. S. N. M.,XLIV, 141, *Hadena.*
1903. Holland, Moth Book, p. 166, pl. XX, f. 7, *Hadena.*
1908. Hampson, Cat. Lep Phal. B. M., VII, 377, *egans* (partim.) *Oligia.*

race *bridghamii* Grote and Robinson

1866. Grote and Robinson, Proc. Ent. Soc. Phila., VI, 17, pl. III, f. 1, *Mamestra.*
1873. Grote, Bull. Buff. Soc. Nat. Sci., I, 108, (*bridghami*), *Hadena.*
1893. Smith, Bull. U S. N. M., XLIV, 141, (*bridghami*), *Hadena.*
1903. Holland, Moth Book p 166, pl. XX, f. 2, (*bridghami*), *Hadena.*
1908. Hampson, Cat. Lep. Phal. B. M., VIII, 376, (*bridghami* partim.), *Oligia.*

form *iridis* Dyar

1908. Hampson Cat Lep. Phal B. M., VIII, 376, pl. CXVII, f. 23 as *bridghami* (for *bridghamii*), partim., *Oligia.*
1923. Dyar, Ins. Insc. Menst., XI, 17. *Oligia.*

The type of *O. egens* must be re-examined by someone possessing considerable material in the group. If it is the same as the Colorado specimen men-

tioned by Smith (1883), it is probably a race distinct from *ferrealis* (*transfrons*). The type came from the vicinity of Hudson Bay, so that it may be the same as *ferrealis* (see Hampson, 1908, who lists *transfrons* synonymous); or it may be the same as *iridis*; forms belonging to the Hudsonian Faunal Zone sometimes extending southward into New England and New York, sometimes extending westward through Manitoba and Alberta. *Bridghamii*, usually spelled *bridghami*, is apparently the eastern representative of *egens*. The figures of Grote (1866) and Holland (1903) represent true *bridghamii*. Hampson's figure (1908) seems referable to *iridis*. A specimen compared with Dr. Dyar's types of *iridis* shows this name to represent a form of *bridghamii* with dark secondaries. Judging from Grote's figure, the type of *bridghamii* possesses some fuscous banding on the secondaries, but the fuscous is not as evenly suffused as on the types of *iridis*.

The name *ferrealis*, heretofore listed as an unplaced species of *Polia* or *Mamestra*, must take the place of *transfrons*. The unique type of *ferrealis* is in the Cornell University Collection, and through the kindness of Dr. W. T. M Forbes, the authors have been enabled to compare it with the series of *transfrons* in the Barnes Collection. Both prior and subsequent to comparison with the type of *ferrealis*, specimens have been compared with the type of *transfrons* in the Neumogen Collection. Both names represent the same subspecies, *ferrealis* appearing to have several months' priority. Holland's figure (1903) as *transfrons*, seems good. Hampson's figure (1908), as *egens*, is probably referable to true *egens*, or is poor.

The various subspecies of *O. egens* possess very similar genitalia, and although there is some variation in the shape of the harpes and the uncus it appears to be purely individual, the genitalia of specimens of the same form from the same locality varying, while the genitalia of some specimens representing each subspecies appear practically identical. All agree in possessing in the ædœagus, besides other armature, a strongly chitinized plate armed with a number of small teeth, thus differing from *violacea*, which possesses a similar plate armed with only four larger teeth.

NOTES ON TWO MOSQUITOES FROM BRITISH COLUMBIA (CULICIDAE, DIPTERA)*

BY ERIC HEARLE,
Banff, Alta.

Aedes mutatus Dyar.

In the Canadian Entomologist for January, 1923, the writer proposed the name *Aedes hewitti* for some small ring-legged *Aedes* of the *stimulans* group that he took in the Fraser Canyon at Yale, B. C., in 1919 and 1920. Although the specimens very obviously came close to *Aedes mutatus* Dyar and *Aedes increpitus* Dyar, the male hypopygium showed sufficient difference from the published descriptions of either of these to warrant the proposal of a separate name.

Unfortunately, it appears that in describing the male genitalia of *Aedes mutatus*, Dr. Dyar had before him an abnormal specimen in which the angular expansion of the filament of the claspette was near the base—this position is

*—Contribution from the Entomological Branch, Dept. of Agric., Ottawa, Ont.

given in all of the keys in which reference is made to this species. On page 40 of Insecutor Inscitiae Menstruus for January—March, 1923, Dyar corrects the description and states that in *Aedes mutatus* Dyar the angular expansion of the filament of the claspette occurs almost exactly at the middle. The difference thus disappears and the name *Aedes hewitti* must be relegated to the synonymy of *Aedes mutatus* Dyar. There is no record of this species having been taken previously in Canada. Its habitats appear to be very restricted. Dyar states that it breeds in the little pools in the flood deltas of swift mountain rivers.

Aedes idahoensis Theobald.

This mosquito of the arid valleys has not been recorded previously from Canada, although Dr. Dyar stated that it would probably occur, at least in the Okanagan Valley of British Columbia (Dyar; Mosquitoes of Canada; Trans. Roy. Can. Inst.: Toronto; Vol XIII; Part I, p. 93; 1921.

In the summer of 1920 the writer carried out a very brief survey of mosquito conditions in the Lower Okanagan Valley, B. C.,—a district where arid, somewhat desert like conditions obtain, and where the valley is open except for a thick vegetation in the river bottom and scattered yellow pine and sage-brush. The survey was made too late in the year for much collecting, but a number of *Aedes vexans* Meigen were taken; among these was found a single female specimen of *Aedes idahoensis* Theobald; this was in such good condition that there was little difficulty in determining its identity. The specimen was taken at Lattimer's Camp near Oliver on August 21st, 1920.

STUDIES IN CANADIAN DIPTERA*

II.—The Genera of the Family Blepharoceridae

BY C. HOWARD CURRAN,

Ottawa, Ont.

Bibionus new genus

Eyes contiguous above, the upper two-thirds with enlarged facets; antennae 14 jointed, as long as head. Mesonotum higher than the head, the suture deep, on anterior half, oblique, slightly angulated before its middle and curving as a faint impression around to behind the inner ends of the postalar calli, but the curve is slight and irregular; this leaves an elongate oval, anteriorly pointed false postalar callus, postero-externally of which the postalar calli is rather weakly differentiated. Legs very long and slender, with short, appressed pile, middle tibia with one, the hind with two apical spurs. Wings large, weak posteriorly, the third vein branched just beyond the anterior crossvein, the branch ending in the first twice as far from its tip as the apex of the third vein is beyond it; anterior crossvein half as long as the rectangular base of the anterior branch of the fourth vein; fifth vein roundedly oblique basad of the crossvein joining it with the fourth vein. Abdomen narrow, compressed, of nearly equal width, its venter slightly wider, plane, with parallel sides; genitalia broader and higher than the abdomen, laterally compressed below, placed at right angles, the basal (upper) plate narrow, the apical (ventral) plate evenly convex from base to upper angles. Type, *B. griseus* n. sp.

This insect shows a remarkable superficial resemblance to some species

*—Contribution from Division of Systematic Entomology, Entomological Branch, Dept. of Agric. Ottawa.

of the genera *Rhamphomyia* and *Empis*, but the antennae, eyes, wing venation, thorax, etc., at once distinguish it and there can be no doubt about its position in the Blepharoceridae. The termination of the branch of the third vein is unique, and the branch of the fourth vein ends before the apex of the wing. The most unusual feature, however, is the remarkably large genitalia, but in essentials even this is quite typical.

A careful study of the wings reveals the presence of an incomplete vein between the fourth and fifth longitudinal veins, a character overlooked at first because of the crumpled condition. There are also the numerous folds as in *Blepharocera*. The character which definitely separates this genus from *Bibiocephala* is the apparent point of origin of the second vein.

The following table of genera includes all those of which I am aware in the world and is based upon Dr. Kellogg's table in Genera Insectorum. In couplet 8 it will be noted that reference is made to the second longitudinal vein being unbranched. Actually the second vein is wholly fused with the third and it is only present in *Bibiocephalus* and *Bibionus*.

KEY TO GENERA

1. No incomplete vein between the 4th and 5th longitudinal veins 2
   An incomplete vein between the 4th and 5th longitudinal veins 7
2. Eyes bisected by an unfacetted crossband or line into a dorsal brownish region of larger facets and lower black region of small facets 3
   Eyes not bisected by unfacetted crossband; radial vein branched 4
3. Wings without basal anterior crossvein (no crossveins) (Europe) ..... *Apistomyia* Big.
   Wings with basal anterior crossvein (Ceylon) ..... *Hammatorhina* Lw.
4. Eyes contiguous above or practically so 6
   Eyes separated above antennae 5
5. Proboscis long, palpi but little developed ..... *Paltostoma* Schin.
   Proboscis not longer than the vertical diameter of the head; palpi well developed, four-segmented ..... *Kelloggina* Will.
6. Tibiae with apical spurs; ungues of ordinary structure .... *Corupira* Mull.
   Tibiae without apical spurs; ungues pulvilliform ..... *Hapotothrix* Lw.
7. No crossvein connecting the fourth and fifth veins (posterior basal cell absent) ..... *Blepharocera* Macq.
   A crossvein connects the fourth and fifth veins (posterior basal cell present) 8
8. The second longitudinal vein is not branched ..... *Philorus* Kellogg
   The second longitudinal vein is branched, the branch either simulating a crossvein near the base of the second vein or rising beyond the anterior crossvein, in which case it is long and reaches nearly to the end of the first vein into which it runs 9
9. The branch of the second vein rises beyond the anterior crossvein and joins the costa a short distance before its apex, eyes broadly contiguous ..... *Bibionus* Curran
   The branch of the second vein usually simulates a crossvein in which case it lies entirely before the anterior crossvein, eyes distinctly separated..... *Bibiocephala* O. S.

This family is poorly known in so far as the Canadian fauna is concerned, and only four species, *Bibiocephala canadensis* Garrett, *Philorus aylmeri* Garrett, and *Bibionus griseus* Curran, all from the Rocky Mountain region, and *Blepharocera tenuipes* Walker from Eastern Canada, are recorded.

Bibionus griseus new species

Long, slender, legs very long, abdomen laterally compressed, venter narrow, but wider than the compressed abdomen, perfectly plane; pile wholly black; antennae 14-jointed.

Length, 10 mm. Wing the same. *Male*. Face small, densely silvery greyish pollinose, cheeks similar, occiput thinly greyish yellow pollinose. Frontal triangle small, sunken, thinly grey pollinose, bare; ocellar triangle larger than the frontal, prominent. Antennae moderately long, the first two joints swollen, the first as wide as long, equalling in length the third and fourth combined, second as long as the succeeding three joints combined, narrow basally, as wide as or slightly wider than the first on apical half, both with moderately long, abundant black pile, the remaining joints much more slender, sub-equal in length, thinly black haired, the pile not conspicuous, appressed. Pile of head wholly black, rather stout on face, moderately short on eyes, but with numerous longer hairs scattered throughout, but these are not numerous enough to upset the uniform appearance of the short ones.

Thorax cinereous pollinose, middle line broadly (narrowly interrupted by a longitudinal cinereous middle stripe on anterior half) and a suturally interrupted stripe on either side on the posterior three-fourths, not reaching the hind margin, olive yellow or pale brownish pollinose, the middle stripe broadly separated from the front margin. The pile is rather sparse, not long, black; more abundant on the pleura; longer behind on the mesonotum and extended somewhat forward. Mesonotum narrowly separated from pronotum by the collar, which is, however, not prominent, the humeri prominent, placed slightly obliquely, their greater surface in front. No suture between the scutellum and thorax, the mesonotum merely continuing back on the horizontal plane, after its posterior convexity, but at the sides there is a deep, narrow concavity; at the base of the scutellum on the middle half there is a moderately wide, transverse, almost flat area, beyond which the scutellum becomes slightly convex, the apex with a narrow, median, vertical depression and on either side with five or six faint ones.

Legs slender, very long, the hind femora reaching to the end of the abdomen, the front four almost two-thirds as long; middle tibiae almost as long as their femora, the others about four-fifths as long, tarsi longer than their tibiae; front coxae short, their trochanters as long as middle coxa and trochanter combined. Middle femora slightly curved forward, the front ones strongly curved forward and somewhat upward, the apical fifth straight. Front tibiae with one, the hind with two apical spurs. Coxae, trochanters, basal half to two-thirds of the femora, less so below, yellowish, hind tibia brownish. Coxae more or less fuscous or blackish basally. Hairs of legs wholly short, black Front basitarsi curved upward; basitarsi of all legs nearly as long as following joints combined.

Wings brownish yellowish. Halteres very long, slender, yellow. Squamae pale yellow, with moderately long black fringe.

Abdomen laterally compressed, very narrow, the venter flat, its margin projecting slightly beyond the dorsal portion, its sides parallel. Ground color black, the sides of the venter luteous, wholly silvery (not white), pollinose, the narrow, dorsal sub-apex of each segment yellow pollinose, the apices darker. Pile black, long basally, but gradually becoming shorter so that on the last three segments it is very short, appressed, and the whole disc bears similar pile. Genitalia reddish, compressed, placed at right angles to abdomen, its apical margin evenly convex, the posterior piece large, widened above so that it is half as wide transversely as its height, the terminal pieces broad, flat, obtuse apically, twice as long as wide, their posterior fourth produced as a rounded lobe, not twice as long as wide; the anterior basal piece is broad, slightly emarginate apically, its corners rounded, its apical piece broadly cleft to the base so that it leaves a narrow, emarginate apical piece on either side, which is over twice as wide as long and longer inwardly. The central cleft is filled with a yellow piece on either side which is triangular from lateral view, its posterior edge longer, its apex slightly excavated. The basal or anterior piece is brown, the superior portion of the posterior piece fuscous. No pile except on the apical lamellae.

Holotype— ♂, Nordegg, Alta., June 26, 1921, (J. McDunnough), No. 587, in the Canadian National Collection, Ottawa.

A NEW SYRPHID FROM ONTARIO (DIPTERA)*

BY C. HOWARD CURRAN,

Ottawa, Ont.

Temnostoma nipigonensis n. sp.

Length, 14 to 16 mm.; *Male* and *Female*. Abdominal markings as in *aequale* but the pale bands are greyish and much narrower, the median black bands on the third and fourth segments entire or the last one narrowly interrupted. Suture of the thorax with two yellowish pollinose spots as in *alternans*; pile of the thorax wholly black, that of the abdomen also black except on the lateral margins. Anterior legs black, the posterior four reddish, their femora more ferruginous, rather brown beneath on more than basal half. Wings as in *aequale*, but more heavily infuscated.

Holotype— ♂, Macdiarmid, (Lake Nipigon), Ont., June 22, 1923, (N. K. Bigelow), No. 666, in the Canadian National Collection, Ottawa.

Allotype— ♀, same data, in Royal Ontario Museum, Toronto.

This species is so very distinct from any described that a complete description seems unnecessary, a comparison with two common species serving better. The almost wholly black pile is very distinct.

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*—Contribution from Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.

A NEW SUBSPECIES OF EURYOPHTHALMUS CINCTUS (HEMIPTERA)*

BY EDWARD P. VAN DUZEE,
San Francisco, California.

Euryophthalmus cinctus californicus new subspecies.

Differs from typical *cinctus* H. S., as found in Mexico, in having the head, the pronotum anteriorly and the lower surface clothed with numerous erect stiff black hairs. On the venter these black hairs are frequently intermixed with pale ones and on the pronotum a tendency toward the same variation may appear thus approaching typical *cinctus*. In the typical form of this subspecies as taken about San Francisco the color is largely black; the extreme base of the first antennal segment and its socket, the bucculæ, acetabulæ, coxæ, trochanters, narrow base of femora, apex of osteolar canal, connexivum, hind edge of pronotum and costal margin of elytra are red and often the genital segment is touched with the same color. Usually the elytra are more or less rufotestaceous or ochraceous, closely and coarsely punctured and varied with black, and at times the pale margin of the pronotum is extended down the sides a little way.

Described from numerous specimens taken about San Francisco, California, where it is very abundant on lupines on which the young feed.

Type, male, No. 1303, and allotype, female, No. 1304, Museum California Academy of Sciences, collected on Lone Mountain in the City of San Francisco, July 23, 1916, by the writer.

This subspecies is characteristic of the cool coastal belt of California, but extends its range eastward to the foothills of the Sierra and southward to Palm Springs and San Diego County, where it mingles with more typical *cinctus* and acquires the shorter cinereous pubescence and loses a portion of the black hairs. The typical *cinctus* is common everywhere I have collected in Sonora and Lower California, and on the islands of the Gulf of California, where it feeds upon Laccodesmia and the related acacias. *E. convivus* Stal. is a broader paler form common in Sonora and especially Arizona, and extends its range eastward to the mountains of Texas. It is very close to *cinctus* and like that form wants the stiff black hairs on the head and pronotum. *E. succinctus* Linn. is nearer to *californicus*, having some of the black hairs on the head and pronotum, but has a longer rostrum. It lives in the gulf states from Florida to Texas. *E. varians* Stal. is a narrower paler form from Sinaloa and farther south in Mexico. *E. davisi* Barb., from Florida, is a redder form with more of the pale tomentum. These six forms should undoubtedly be considered as geographical races or subspecies of one species (*succinctus* Linn.) as all intergrade where their distribution overlaps and the first four at least, of which I have examined the males, have the same form of male claspers.

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